SOIL CONSERVATION

promotes

Grassland FARMING

SOIL CONSERVATION SERVICE
U.S. Dept. of Agriculture
Washington, D. C.

A REPORT - -

FOREWORD

A few decades ago, much was being said about how important it was for the South--and many other parts of the country--to adopt a much more diversified type of agriculture. Emphasis was placed on the production of more livestock and the growing of more feed, grass, and legumes for the livestock. It was argued that grass, legumes, livestock, and the manure produced were essential to sustained production on farms needing such increased diversification.

Both farmers and city people needed more milk, butter, and beef, we were told at this earlier date. Nowadays we are being told to drink more milk and eat more beef because of their rich food value and good content of vitamins.

Then, in 1933, came the conservationists (of the Soil Erosion Service) planning farms according to the kind and condition and the needs of the land. This called for more grass, more legumes, and more livestock.

Thousands of acres of steep eroding land and other thousands of acres of severely eroded land were planted to kudzu, sericea, and other adaptable grasses and legumes, and the work proved popular and profitable. Farmers were told that, aside from health, grasses, legumes, and livestock would improve their land--make it richer and protect it from the impoverishing effects of erosion.

The effectiveness of grass in holding soil against erosion on sloping land is so great that it is difficult to fully comprehend the significance of the measurements. For example: At the Northwest Appalachian Conservation Experiment Station near Zanesville, Ohio, bluegrass, limed and fertilized was 5,227 times more effective in holding soil and 10 times more effective in conserving rainfall than continuously grown corn on the same kind of land. Putting it another way, an acre of bluegrass for 8 consecutive years lost on an average only 38 pounds of soil annually, while on precisely the same kind of land used continuously for corn, the corresponding loss amounted to 198,000 pounds.

When drought and wind began to damage large areas in the Great Plains country, we had to turn to grass on a large scale in order to establish anything resembling soil stability. We even used weeds to hold the soil, and we saved all crop residues for their stabilizing effect against erosion. Numerous native grasses and legumes throughout the country were brought to the conservation nurseries operated by the Soil Conservation Service and tested

through observational methods for their practical possibilities in fitting usefully into the national program of soil and water conservation and flood control. We worked first and hardest with the Plains grasses because it was there, during the early days of soil conservation, that we were confronted with the most difficult problems.

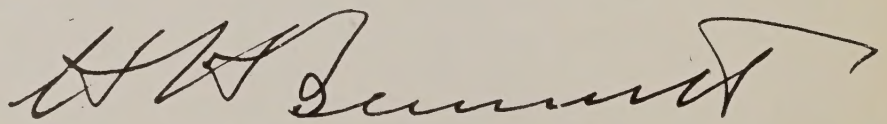
As the result of these observations and the use of these grasses on farms practicing soil conservation throughout the country, some 40 different grasses, never before cultured anywhere so far as we know, were brought into use, many of them on a large scale. At the beginning of the work, you probably couldn't have bought a tablespoonful of the seed of these valuable plants in any seed house anywhere; but now they can be bought by the carload in some instances.

Moreover, the Service has, since its very beginning, carried on a program of spreading the domesticated grasses, both imported and native, to a vastly wider use than at any preceding time But here again, the grasses were first tested as to their local adaptability and over-all usefulness.

On June 26, 1951, I drove over into Virginia to see how grass agriculture was getting along in the battleground country of First and Second Bull Run. All the way from Manassas to Culpeper and beyond, it was estimated that considerably more than 50 percent of the "cultivated" land had been turned from corn and wheat to grass-livestock farming, with a strongly continuing tendency in that direction. Orchard grass production had taken a strong foothold, but Suiter's grass (tall fescue) is now coming in as a competitor or partner. The latter does especially well on wet land, such as the flats and depressions of Croton silty clay loam so common to the area. It does well also on the well-drained ground of that section--and other areas within a rapidly expanding territory.

On the first farm where we stopped, there had just been harvested and shocked a crop of Suiter's grass seed. This was on a 100-acre farm, 40 acres of which had produced an estimated 400 pounds of seed per acre. Wet flats and depressions, not particularly good for corn and only fair for wheat, all had produced excellent results with Suiter's grass--which remains green and palatable throughout the winter.

So, it seems to me, we are at last getting very busy doing with grasses and legumes in our Southern agriculture--and our American agriculture, also--what we were advised to do some decades ago. We still have a long way to go, and for that reason the following brief account of the progress made so far is recorded for whatever suggestive help it may give the National Grassland Program. But, let me make a prediction: Because of the great interest in grassland development under the soil conservation program, 5 years hence we will have made such further advances that the acres of improved grasslands in 1951 will be looked back on as representing little more than a start.



Chief
Soil Conservation Service

July 1951.

SOIL CONSERVATION

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GRASSLAND FARMING

A grassland boom is sweeping the country. It amounts almost to a revolution in American agriculture. Farmers and ranchers of the Nation are now planting each year around three times as many acres to grass and legumes as they were planting 20 years ago. Hundreds of thousands of farmers who never planted a grass or legume crop until a few years ago are now planting a major part of their farms to these sod crops. Ranchers who never thought of planting grass before are planting thousands of acres to native or introduced grasses, or both.

The boom in grassland farming has been building up for some 16 or 17 years. It was held back partially by a lack of seed during the thirties; then World War II tended to check the movement for several years. Since the war, however, it has rapidly gained momentum. Each year has shown a decided increase in the amount of grass and legume seed harvested and in the amount planted. The 1950 seed harvest was by far the largest of all time; more than a billion pounds of grass and legume seed were harvested throughout the Nation. The 1951 harvest promises to be even greater. The supply of some kinds of seed is still not equal to the demand. But the record harvest of last year did much to solve the seed shortage and open the way for record plantings last fall and this spring.

More than three times as much grass and legume seed was harvested in 1950 as was harvested 20 years ago.

The grassland boom is tied up closely with the Nation's soil conservation program. In fact, the boom may be attributed in large part to the conservation work done by some 2,300 soil conservation districts and their 900,000 cooperating farmers and ranchers, aided by the Soil Conservation Service and other agencies. These districts and the Service were mainly responsible for about 40 percent of the seed harvest for the entire nation last year; they accounted for nearly all the harvest of native grass seed and many of the other newly and increasingly used pasture grasses and legumes. The soil conservation districts are responsible for a great part of the increased plantings.

This report deals mainly with the part played by soil conservation districts and the Soil Conservation Service in helping develop a grassland agriculture for the nation. More particularly it is a review of what these and other agencies have done toward producing more and better seed for the steadily increasing grass movement.

A Record Seed Harvest

More than 425 million pounds of grass and legume seed were harvested last year in soil conservation districts through the efforts of these districts, their cooperating farmers and ranchers, and the Soil Conservation Service. This is enough seed to plant more than 20 million acres of new and improved pasture and range, meadow, and cover crops. A major part of it will be used by the 900 thousand conservation farmers and ranchers now cooperating with soil conservation districts. The remainder will be used by the neighbors of these farmers or will find its way into use through commercial seed channels.

This record harvest included seed of practically every kind of sod crop that has proved useful on American farms and ranches. Seed from such native grasses as the bluestems, gramas, and sand lovegrass were harvested by carload lots. Seed from such introduced grasses as tall fescue, crested wheat-grass, and Bahia grass were harvested by the millions of pounds. A record harvest was made of such soil-building legumes as lespedeza, clover, kudzu, lupine, birdsfoot trefoil, and vetch. Seed from many of the plants were never available to farmers and ranchers until a few years ago; some of them had not been domesticated. They may be bought at seed stores today mainly because of the efforts of soil conservation agencies. The domestication of some 40 native grasses and legumes was accomplished through the nurseries of the Soil Conservation Service.

Grass Was Taken for Granted

Grass was more or less taken for granted by most American farmers up to the beginning of the soil conservation program a few years ago. Some farmers planted such hay crops as timothy, brome grass, or orchard grass. A few planted bluegrass or some pasture grass mixtures. But, in the main, if a farmer or rancher wanted grass for pasture or prairie hay, he just waited for it to grow. Sometimes nature would plant and grow a fairly dense stand of good grass; more often she grew a scant stand of grass along with plenty of weeds. Even those who planted grass seldom thought of fertilizing it or giving it any other special care. They took it for granted that grass could take care of itself. And, for the most part, they grew it for hay or pasture, with little thought for its great value in soil conservation.

Legumes were given a little more consideration, but not nearly enough. Too often, when planted, they were planted on the poorer land and given

Grass was largely taken for granted by American farmers up until a few years ago. Too many pastures looked like this one -- a scant stand of poor grass with plenty of weeds.

no special care. They were used by few farmers in regular crop rotations, and seldom used as cover crops or catch crops for soil conservation. In other words, American farmers were essentially row-crop and grain farmers. Improved grasslands had little place in the scheme of American agriculture.

It is vastly different now. Grass and legumes have become important crops to hundreds of thousands of farmers and ranchers all over the nation. They plant, fertilize, and take care of these crops just as diligently as they do their corn, cotton, or wheat. They have become "grassland farmers."

What Is Grassland Farming?

The term "grassland farming" has become a popular figure of speech in our agricultural language during the last few years. It is popular with farm journalists; it is decidedly popular with soil conservationists, county agents, and most other professional agriculturists. But more important, it is rapidly becoming one of the most popular terms with progressive farmers and ranchers of the nation. What does it mean? It simply means giving grasses, legumes, and other sod crops a more important

place in the farming system. It means more and better pastures and ranges and more livestock. It means more grasses and legumes in the crop rotations and more and better hay crops and silage. It means more and better cover crops, grass waterways, strip crops of grasses and legumes, and the use of sod crops in other ways to help conserve land and water. It also means better balanced and more profitable farming. And this vegetative program which the Service has emphasized and pushed from the beginning helps the wildlife work of the Soil Conservation Service, for which it has become widely recognized.

Practically all grasses and legumes conserve and improve the structure of the soil. They are the principal agents for controlling erosion on sloping land. Nearly always they improve both soil tilth and fertility and increase the water-absorbing and water-holding capacity of the soil -- while growing and after being turned under as green manure or left on the ground surface as a mulch.

The advantages of grassland farming, moreover, are not limited to beneficial effects on the land. Grassland farming takes less labor than cultivated crops. The labor is usually distributed more evenly over the year, and in these times of farm labor shortage this is important. It has increased the income of nearly all the farmers who have tried it. Furthermore, it is usually a more interesting and enjoyable way of farming. Many farmers enjoy work with livestock more than they do the harder labor of planting, cultivating, and harvesting row crops. And good grass is the main base for profitable livestock farming.

Grassland farming means -- More and better pastures.

Better ranges.

Better meadows

Grassland Farming for Erosion Control

With all the advantages, one might suppose grassland farming would have become more popular long ago. More pay with less work and more enjoyable work should appeal to any farmer! But as long as good land was plentiful, few farmers awoke to the fact that more grass and legumes meant better pay and less work. Most of them started grassland farming within the last 10 or 15 years, mainly to control soil erosion. They became increasingly interested when they saw how their farms and ranches were safeguarded from impoverishing erosion and useless run-off of water, and otherwise benefited. Then they also learned that these crops and the milk and beef they produced were profitable.

When the old Soil Erosion Service (which later became the Soil Conservation Service) started its conservation program back in 1933, the need for more grassland farming became obvious. There was no other practical way to plan a soil and water conservation program for a great many farms and ranches. Technicians of the Service began recommending more and better grass. Conservation-conscious farmers and ranchers soon saw the light, and the grassland boom began to get under way.

Contour strips of grass and legumes help control erosion on sloping fields.

Stable grass waterways are an essential feature of conservation farming.

Grasslands Bring Up New Problems

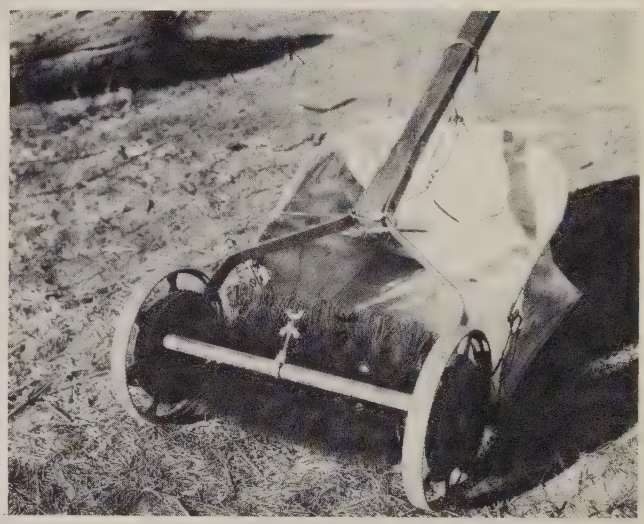
It was not all smooth sailing as conservation-conscious farmers began to improve and expand their grasslands. More was involved than just planting grass on formerly cultivated land and watching the grass grow. It wasn't always cheap or easy to change from straight row-crop farming to grassland farming. More grassland usually meant more livestock. Many farmers had to buy the livestock, often on credit. Some row-crop farmers found that they had to learn new methods of farming in order to grow and harvest these hay and pasture crops. In some instances new machinery was needed. Usually more fences were necessary. In fact, it almost added up to a new way of farming for most farmers, and often it meant a complete overhauling of the farm. In spite of these obstacles, however, the grassland movement gained adherents rapidly.

Not Enough Seed

Both the soil conservation technicians and the farmers soon ran into another difficulty: They couldn't find enough seed to plant all the pastures, ranges, eroded fields, and waterways that needed to be covered with a good sod. Seed for a few of the standard hay crops, such as alfalfa, timothy, and red clover were plentiful in some sections. But these hay crops did not fill all the needs, even if the supply of seed had been adequate. Annuals, biennials, and quick-maturing perennials were needed in large amounts to serve as cover crops and to fit into good practical rotations. And there was a great need for permanent pasture plants and for sod crops that would stabilize waterways, gullies, and steep, eroded slopes. Kentucky bluegrass seed and a few other pasture plants that do well on good soil were available in some sections. But these standard pasture plants seldom did well on the eroded lands and in conservation waterways where most needed. In the Great Plains there was practically no grass seed that could be planted effectively on "blown-out" fields, shifting dunes, and depleted ranges.

The Plains situation was critical in most places. Conservationists often resorted to stripping native grass seed by hand with WPA and CCC labor. They even swept up buffalo grass seed from the ground with a broom and dust pan. They invented home-made seed harvesters of various types. Some technicians found they could harvest blue-

Seed were so scarce for many species during the early years of the conservation program that they were often harvested by hand.

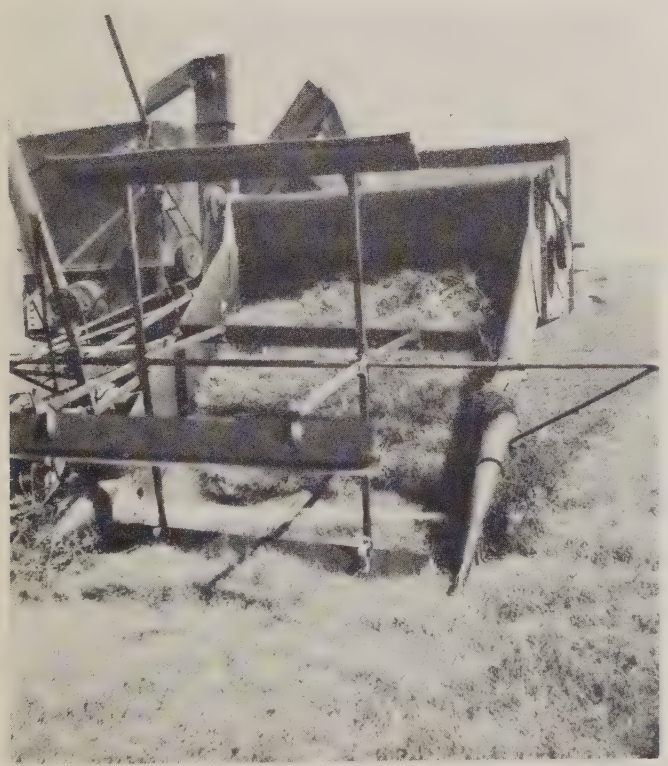


Many home-made machines were used by early SCS technicians to harvest grass seed. This lawn mower was modified to harvest buffalo grass seed.

Bluegrass seed strippers were modified to harvest native grass seed.

stem and grama grass seed by using a modified bluegrass seed stripper. Others simply took scrap metal and built their own version of what they thought would be a good grass seed harvester.

Many of these home-made machines worked quite well. But there were not enough of them to keep up with the ever-increasing demand for seed. Then the technicians found that a small grain combine could be modified to harvest most of the native grass seed. This largely solved the grass seed harvest problem, but it didn't solve the problems of finding enough of the right kinds of seed to harvest.



Harvesters and combines were modified to harvest many kinds of seed. This one is harvesting buffalo grass seed.

Conservation Nurseries Grow More and Better Seed

From the beginning, technicians of the Soil Conservation Service had recognized that they didn't have precisely the right kinds of grass and legume plants for every need. To meet this problem, conservation nurseries began to be set up in the fall of 1934. Eventually there were more than 50 of these nurseries. The Soil Conservation Service still operates 24 of them. Their main job was to produce a supply of seed for the various needs of the Service.

The nursery specialists classify their work under six categories: (1) exploration, (2) observational studies, (3) initial increases, (4) field trials, (5) multiplication, and (6) distribution.

The exploration work consists of exploring the world to find new species or better strains that might serve a useful purpose in the Nation's soil conservation program. Up to the present, thousands of different kinds of promising grasses and legumes have been ferreted out and their values observed in the nurseries. Some of the foreign species came through the Plant Exploration and Introduction Division of the Bureau of Plant Industry. Some were picked up by Service technicians traveling abroad and others were sent by friends and scientists from foreign countries. The highways and byways of this country were searched, too, for both native and naturalized species and varieties. Several dozen native grasses have already proved worth while, and have gone into use in our American agriculture as domesticated natives.

The observational studies often begin before seed are planted in a nursery. Much can be learned about a plant's capabilities by observing it in its natural habitat. For example, a patch of big bluestem thriving in an area normally too dry for this species would justify the assumption that here is a plant that may have drought-resistant characteristics worth looking into.

Observational plantings were made of thousands of species and strains of grasses and legumes at SCS nurseries.

When a strain of grass or legume has been proved valuable at a nursery, large seed-increase fields are planted. The seed are harvested and distributed to farmers and ranchers through their soil conservation districts.

Many of the strains and species brought into the nurseries were tried mainly because of the conditions under which they were found growing in the wild.

All promising strains or species are planted in small plots at one or more nurseries. They are observed and their growth habits studied for several years. If they look exceptionally good, seed are harvested and larger plots planted. Then the seed are harvested from these plots and planted on several farms of the region to see whether the plants still look good when grown under average farm or ranch conditions. If a plant meets this test satisfactorily, the conservation nursery then plants large plots for multiplication purposes. Seed harvested from these fields are shipped in small lots to soil conservation districts in those areas considered adaptable to the plant. Enough seed to plant about 5 acres is usually sent to each district. Districts turn the seed over to selected farmers for multiplication. Farmers, in turn, multiply the seed and sell them to their neighbors.

The Spread of Better Grasses and Legumes

It was through this conservation nursery program of discovery, observation, multiplication, and distribution that many of the important grasses and legumes of today were spread to grassland farmers. In 1938 nurserymen of the Service discovered two promising strains of Bahia grass, one at Pensacola, Florida, and the other at Wilmington, North Carolina. The original seed of these grasses undoubtedly had come to the country as stowaways on ships from South America. Some seed were collected and observational plantings made at two Service nurseries. Both grasses came through all tests most promisingly and were then multiplied at the nurseries and distributed to soil conservation districts throughout the Southeast. More than 100 thousand acres had been planted to these grasses by 1950. Last year enough seed were harvested by farmers and the nurseries to plant another 150,000 acres. Thus a valuable new pasture plant was added to the Nation's agriculture.

Most farmers and ranchers in the central and southern Great Plains who knew anything about sand lovegrass knew that it was a good pasture plant for sandy land. It covered most of the sandhills country when the region was settled. Livestock liked it so well they grazed much of it into the ground. During the long drought of the early thirties this succulent grass all but disappeared from many of the pastures and ranges of the region. But it was

just the kind of grass needed to stabilize some of the blowing fields and sand dunes. Soil Conservation Service nurserymen and field technicians set to work to produce and distribute sand lovegrass seed. It wasn't necessary to make observational studies on this species; the grass had already proved itself growing in the wild. Seed were collected along highways and in odd places where the grass had not been killed out by grazing. These were sown in the nurseries and on other government-owned land, and then distributed to farmers and ranchers through their soil conservation districts. Already hundreds of thousands of acres of formerly blowing ranges and sandy croplands have been stabilized with sand lovegrass. Last year enough seed were harvested to plant another 400 thousand acres.

Sand lovegrass had almost disappeared from pastures and ranges of the Great Plains until SCS nurseries started collecting and multiplying seed. Now many conservation farmers, such as this one in western Oklahoma, grow seed of this valuable grass as a cash crop.

Something over a decade ago it was learned that a strain of tall fescue

Enough Suiter's grass (tall fescue) seed were harvested by the SCS, soil conservation districts, and cooperating farmers in 1950 to plant a million and a quarter acres. This is a typical seed-production field in northern Virginia.

had been growing on the Suiter farm in eastern Kentucky since about 1890. In 1941, the Soil Conservation Service bought about 100 pounds of seed from this farm. The purchased seed were planted at the Chapel Hill nursery in North Carolina for increasing the supply. Since 1942, enough seed have been produced from the original purchase to plant one or more 5-acre seed-increase plots in soil conservation districts in 687 counties in the Southeast. The grass, known as Suiter's grass, tall fescue, Kentucky fescue, or Kentucky 31, has proved so sensational that it has spread widely through the Southeast and as far west as Texas and Oklahoma. It also has spread to the Middle West and parts of the Northeast. By 1950, more than a million and a half acres had been planted throughout the country. Enough seed were harvested last year to plant another million and a quarter acres.

The story of crested wheatgrass in the northern Great Plains is somewhat similar to that of Suiter's grass. Crested wheatgrass was introduced into this country from Russia in 1898. The North Dakota Experiment Station at Mandan showed that it was a valuable

grass for the region, as early as 1915; but by 1934 only a few thousand acres had been planted by farmers and ranchers. Soil conservationists decided it was one of the best grasses to plant on "blown-out" cropland and denuded ranges over most of the northern and central Great Plains. Nurserymen and field technicians began multiplying the seed and distributing them through soil conservation districts. Millions of acres have now been planted to this valuable pasture plant.

Crested wheatgrass wasn't planted extensively until soil conservationists started pushing it. Now hundreds of thousands of acres are planted each year. This pasture was formerly a blown out wheat field in eastern Wyoming.

Blue lupine was doing fine at the State experiment station at Quincy, Florida, in 1937; but not much of it was being grown by farmers. Soil conservationists observed it and thought it might make a fine winter cover crop, especially for peanut fields of the South. Nurseries and field technicians started multiplying and distributing the seed. Soil conservation districts of the South gave excellent cooperation. During World War II, peanut acreage was greatly expanded. Erosion had been unusually severe on the sandy peanut soils after the crop was harvested. In this situation, blue lupine proved itself a valuable soil saver, as well

Blue lupine was doing fine on the State experiment station at Quincy, Florida; but few farmers were planting it until soil conservationists began recommending it. Now, most conservation-minded peanut farmers plant it for winter cover and soil-improvement.

as soil-improver. Today, practically all conservation-minded peanut farmers seed their peanut land to blue lupine during the summer. It serves as a protective winter cover and is often plowed under as green manure in the spring. In 1950 enough blue lupine seed were harvested to plant more than two million acres.

Birdsfoot trefoil was growing wild in parts of New York state, but few or no American farmers planted it as a forage or soil-conserving plant until Soil Conservation Service agronomists tried it out. They collected some seed by hand labor with CCC boys and made trial plantings at a Service nursery. It did so well, even on land that was unsuitable for most other northern legumes, that Service conservationists began recommending it for pasture mixtures on poor land. Now it is spreading rapidly over most of the Northern States. Last year, enough seed were harvested to plant more than 50,000 acres.

The story goes on and on: Ladino clover was well known to most agronomists and a few farmers of the Eastern

States, but it was not being planted extensively. Conservationists began recommending it as a soil-conserving and forage plant. Its use spread rapidly. Enough seed were harvested last year to plant nearly a half million acres. Crimson clover was well known through the East and South, too, but it was not used extensively until soil conservationists started using a "hard-seeded" strain that would reseed itself annually. Now it is planted by the hundreds of thousands of acres. The seed harvest for last year alone was enough to plant nearly a half million acres.

The lespedezas, vetches, and many others have similar histories. And we should not forget kudzu and Bermuda grass (usually multiplied by crown or sprig plantings). These gully-stoppers and fine pasture and hay plants came into widespread use mainly because conservation farmers and technicians wanted plants that would stop soil erosion while also producing good forage.

Then there are blue panicum, weeping lovegrass, and King Ranch bluestem in the Southwest. One of them came from Australia, one from Africa, and the other originally from Asia. All three are valuable strains, now spreading rapidly among Southwestern ranchers and farmers. Pangola grass from Africa is spreading rapidly as a pasture plant in Florida, especially on sandy lands. Smooth brome grass in the Middle West and many native grasses, such as the bluestems, gramas, and Indian grass in the Great Plains, have spread phenomenally. Dozens of others have had less phenomenal histories but are filling important needs for certain situations. And the process of exploration, observation, multiplication, and distribution is still going on.

Blue panicum was brought to this country from Australia and is now spreading rapidly among conservation farmers and ranchers of the Southwest.

This field of King Ranch bluestem was planted in rows for seed production; three crops of seed are harvested each year. KR bluestem was doing fine on the King Ranch in south Texas, but it was spreading very slowly until SCS nurseries selected a promising strain and began multiplying and distributing the seed. This drought-resistant grass is now spreading rapidly over the Southwest.

Conservation Farmers Grow More Seed

We must not overlook the farmers, however, while giving credit to the Soil Conservation Service, the Experiment Stations, other government agencies, and the 2,300 soil conservation districts of the Nation for what they have done. In the final analysis, it was the conservation-minded farmers and ranchers of the Nation who planted the grass and who are now growing it. Also, they are the main ones who made the record seed harvest of 1950 possible.

Once the grassland farming program began to gain momentum, it was not hard to get farmers interested in harvesting seed. Grass and legume seed became one of the best cash crops. Thousands of farmers and ranchers, all over the Nation, soon found that they could sell their seed crop for much more than they could sell a corn, cotton, or wheat crop from the same land. In addition, they usually got a lot of good pasture or hay from their grasses and legumes. Many conservation farmers started using some of their best crop land to grow grass and legumes for seed. Some irrigation farmers in the West planted native grass in rows and cultivated and irrigated it to produce seed for market.

Grass and legume seed have recently become one of the best cash crops for many conservation farmers. Some farmers, like this one in California, cultivate and irrigate grasses to increase seed production.

Bill Oliver of Phillips County, Colorado, planted 16 acres of crested wheatgrass in 1945. The following year he pastured it all spring and then harvested 400 pounds of seed per acre from the plot. He estimated that the seed crop alone brought in twice as much cash as he would have gotten from a corn or wheat crop on the same land.

Wendell McMinimy of Clark County, Kansas, planted 10 acres of sand lovegrass in 1947. He mowed the weeds in the patch the first year and sprayed with 2,4-D the next year. In the fall of 1948 he harvested 5,700 pounds of grass seed. He sold most of the seed for $3 to $5 per pound. He said it was by far the most profitable crop he had ever grown.

Helen Eaton and Louise Starr (former school teacher and telephone operator) of Chatauqua, New York, obtained a cup full of birdsfoot trefoil from Miss Eaton's brother, who was working for the Soil Conservation Service, in 1936. They planted the seed on a small plot and multiplied it. By 1939 they were able to harvest 350 pounds of seed, some of which they sold. They kept increasing their own plantings until they now have 100 acres. Last year they harvested more than 4,000 pounds of birdsfoot trefoil seed and sold most of it for about $2 per pound.

Bryce Marshall of Cottle County, Texas, planted a small field of blue panicum when it was first introduced to his neighborhood in 1947. The field was one of the poorest on his farm. But he sold $160 worth of seed per acre from the field in one year and had an excellent pasture for most of the summer.

R. L. Douglas in the Pulaski-Alexander Soil Conservation District of Illinois was one of the first Midwestern farmers to start growing Alta fescue (tall fescue). He has a 6-acre field from which he harvested more than 4,200 pounds of seed last year. He figures that his seed crop alone was worth more than $300 an acre. In addition, he grazed the field for 5 months.

The Jones brothers of Huntsville, Alabama, are in the seed business in a big way. They harvested 100 thousand pounds of Suiter's grass seed in 1950. George L. Whitcomb of Chase County, Kansas, is another big seed grower. He harvested about 40 thousand pounds of brome grass seed and 1,500 pounds of intermediate wheatgrass seed last year. The Med-O-Dale Farm of Altamont, New York, harvested about 24 thousand pounds of birdsfoot trefoil seed last year. J. M. Hereford & Sons of Gurley, Alabama, harvested about 45,000 pounds of button clover seed in the spring of 1950. H. Owen Murfree of Prattville, Alabama, has been harvesting 40 to 50 thousand pounds of crimson clover seed each year since 1948. Bill and Roy Cater of Taos County, New Mexico, have been harvesting around 15,000 pounds of crested wheatgrass seed each of the last 3 years.

Some 50 farmers in the Tallahatchie River watershed of Mississippi started growing kudzu plants for use in the flood-control program of that watershed. Last year they produced more than 2 1/2 million kudzu crowns. These are just a few of the thousands of farmers and ranchers who started growing grasses and legumes mainly to conserve or improve their land and then found that these plants were their best cash crop.

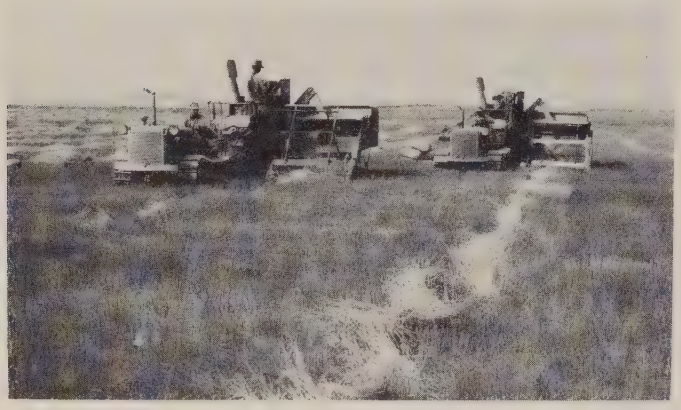
Many ranchers, like this one in west Texas, harvest native grass seed from their better ranges to use in reseeding the poor ranges.

The Soil Conservation Service planted grass on hundreds of thousands of acres of submarginal land owned by the government. This land now serves as valuable range and pasture and produces seed for conservation farmers and ranchers.

Seed from Government-owned Land

The Soil Conservation Service has greatly increased seed production on the government-owned land turned over to it for administration some years ago. In 1939 it was assigned management and development responsibility for some 7 million acres of submarginal land that had been purchased earlier by the government. This land was located in 86 projects scattered throughout the country. Much of it was severely eroded and needed to be planted to trees or grass. Grass seed plots were established on many of the projects. Seed production was multiplied. For several years, most of the supply of seed thus produced was used to plant the eroded and run-down land on the projects. By the late forties, however, these government lands were producing a surplus of certain seeds for use by farmers and ranchers. Last year about a million pounds of grass and legume seed were harvested from these submarginal lands. Most of this seed was harvested by Soil Conservation Service employees. But in some instances, the seed was harvested by soil conservation districts or grazing associations that had leased the land from the Service.

For example, the Choctaw County and Winston County Soil Conservation Districts of Mississippi have 1,746 acres of grassland leased from the Service which are used for seed production. In 1950, these districts harvested more than 23 thousand pounds of seed from this area, which they sold to farmers in the districts for about $10,000. These districts own two combines and tractors and a seed cleaner. They also have equipment for land preparation, planting, and mowing the grass crops and have storage bins for the seed.



Around a million pounds of grass and legume seed were harvested from submarginal land owned by the government and managed by SCS in 1950. All this seed was used to advance the Nation's grassland program.

Grassland Program Gains Support

The grassland farming program received something of an impetus in 1937, when the International Grassland Congress was held in Great Britain. A considerable number of agricultural scientists from the United States attended the Congress. They came back with new ideas, many of which they passed on to their colleagues and to farmers. About the same time the Department of Agriculture began to make conservation payments to farmers and ranchers who improved their grasslands or who planted grass or legumes as soil-conserving crops on cultivated land. These things helped to speed up grassland farming.

The grass boom and the grass seed harvest were held up to some extent by World War II. Demands for maximum production of oil, grain, and fiber crops tended to discourage the planting of hay and pasture crops. Yet some progress was made even during the war, especially on the renovation of old pastures and in the protection of eroded lands and waterways with sod crops. Soon after the war was over, the grassland boom really began to gain momentum, and the grass and legume seed business moved into the sphere of big business.

Seed Cleaning and Processing Needed

In the meantime new problems arose. Many grass seeds need cleaning, decortication, or other processing before they can be advantageously planted. Also, the seed often need to be dried to prevent heating before storing or shipping. At first, soil conservationists and farmers did most of the cleaning on the farms with home-made cleaners or with hammer mills and fanning machines. Fresh seed were dried by spreading in thin layers on the barn floors. But when seed began to be produced by the hundreds of thousands of bushels, these

During the early years of the soil conservation program, many farmers and technicians cleaned grass and legume seed with home-made screens and scalpers such as this.

An improvised seed-cleaning plant used by a Texas farmer. The fanning mill (left) cleans a mixture of grass and legume seed. The spiral seperator (right) seperates the two.

improvised methods proved impractical. Commercial cleaning and drying plants were needed, especially for seed that were being offered for sale through commercial channels. Then cleaning and processing plants began to spring up all over the country. A new industry was created.

In 1940, W. A. Womack of Ashford, Alabama, planted 35 acres of blue lupine for seed. The seed crop proved so profitable that he increased his plantings to about 500 acres by 1946. He harvested around 750 thousand pounds of seed that year. As his seed production increased, he found it impractical to clean the seed with a small fanning mill. He started a commercial seed cleaning and drying plant and began custom cleaning for his neighbors. Then he increased his storage facilities and soon was in the seed processing business on a commercial scale. He began to grow large quantities of sericea lespedeza, crimson clover, and Bahia grass for seed. Now he is fully in the seed business. Not only does he market his home grown seed all over the Southeast, he also cleans and stores seed for most of the other farmers of his community.

As the grassland boom progressed, seed cleaning and processing plants began to spring up all over the country.

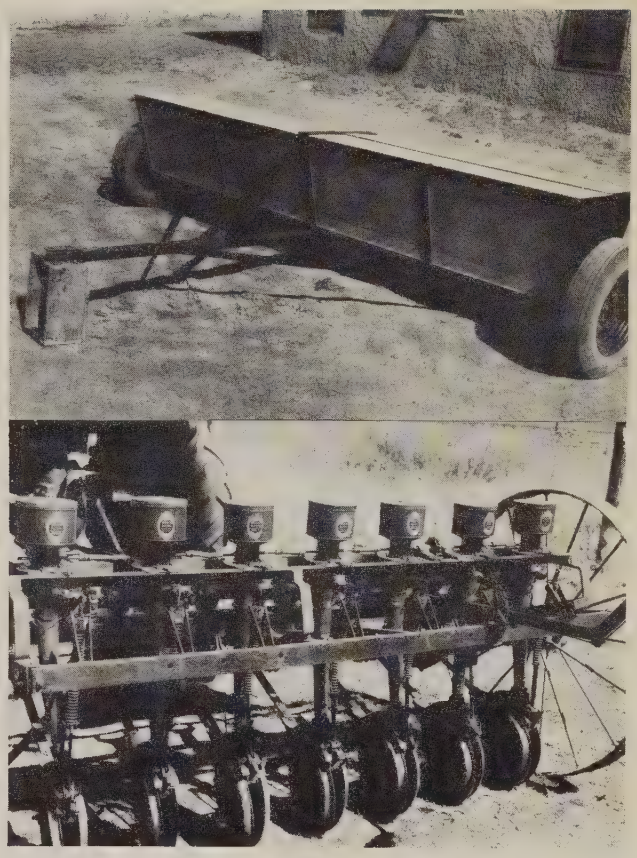
Large quantities of seed can be cleaned and sacked in a few minutes in a modern commercial plant, like this one in northern Virginia.

Womack's experience is an example of how the seed business has grown by leaps and bounds during the last few years. In January 1951, there were about 165 commercial seed cleaning plants in Alabama alone. There were no more than 10 such plants in 1935. There are more than a thousand such plants throughout the Nation. Practically all farmers in soil conservation districts of the South and Southwest now have access to a commercial seed cleaning plant, and the industry of seed cleaning is rapidly spreading to other parts of the country.

Some seed processing plants are operated by soil conservation districts. Many others were created at the instigation of and with the support of district supervisors or the soil conservationists working with districts. For example, in 1949 the supervisors of the Santa Fe Soil Conservation District in Florida saw an acute need for a seed cleaning and drying plant. They bought the necessary equipment and constructed a small plant, at a cost of about $4,000. During the first 2 years of operation, the plant processed about 650 thousand pounds of grass and legume seed valued at more than $150,000. The original cost of the plant was paid for from the processing charges. Furthermore, two privately owned seed processing plants have since been constructed in this district, mainly because of the showing made by the district-owned plant.

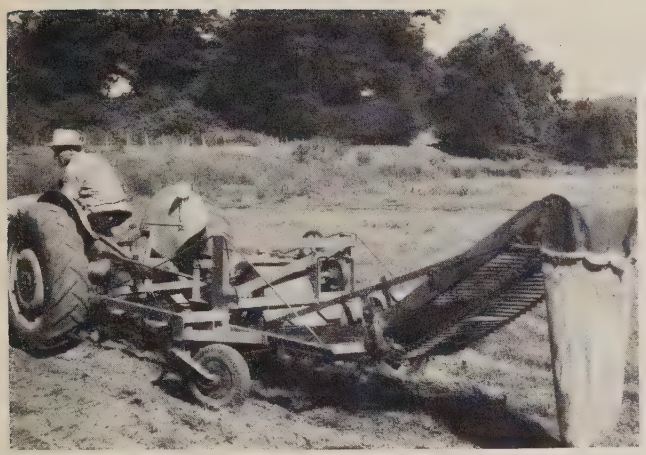
Better Planters Developed

But getting enough of the right kinds of seed was not the only problem of the early conservationists and grassland farmers. Planting the seed of many species often presented a problem. Planters were not available that would properly handle such trashy seed as the bluestems or such minute seeds as lovegrass. Hand sowing was often resorted to in the early stages. Some farmers planted native grasses by cutting the hay, after the seed were ripe, and scattering it over their fields.



SCS technicians devised many types of special-purpose grass seed planters. They made a light-weight drill (above) that would plant trashy native grass seed evenly while being pulled behind a truck at 15 miles per hour. They devised attachments to a drill (below) which would plant seed so fine that only 4 tablespoonfuls were needed per acre.

Again soil conservation technicians put their mechanical skills to work. They devised various types of home-made planters that would handle just about any kind of seed anyone would want to plant. They developed attachments to drills that made it practicable to drill in seed so fine that around four tablespoonfuls were enough to plant an acre. They invented a Bermuda grass sprig planter that greatly speeded up the laborious work of planting this excellent erosion-control plant. They interested farm machinery manufacturers in copying and improving on these home-made seed sowers. Today there are several excellent machines on the market. Many soil conservation



SCS technicians helped devise this Bermuda grass sprig harvester to speed up to the job of getting this valuable grass established on eroding lands of the South.

districts own from one to a dozen grass seed planters. They rent them to farmers who wish to plant grasses or legumes that an ordinary planter or grain drill will not handle properly.

Planting seed mixtures evenly also presented a problem in some sections. Some Service technicians in Texas built a combination planter that would seed trashy bluestem seed out of one spout, fine lovegrass seed (2 to 5 million seed per pound) from another spout, and fertilizer from a third spout. They took their home-made planter to a farm machinery manufacturer and had him make 48 of the machines. They are now using these planters to seed hundreds of thousands of acres of eroded land to native grasses as a part of the flood-control program of the Trinity and Colorado Rivers in Texas.

A Soil Conservation Service nurseryman in California experimented with ways to mix various seeds before putting them in a planter and have them stay evenly mixed until planted. He tried various dilutents, including sand and sawdust, but still the small, heavy seed tended to settle to the bottom and come out first while the light, fluffy seed generally went through the drill last. He then tried rice hulls as a dilutent. These worked perfectly. Rice hulls are cheap and plentiful in California. A mixture of alfalfa, orchard grass, Ladino clover, birdsfoot trefoil, and rye were planted with a grain drill after being mixed with rice hulls, and the stand was very even all over the field.

Grassland Research Expanded

There were many other problems confronting the modern grassland pioneers: Which grass or legume or mixture to use, where to use it, what kind and how much fertilizer to use under varying conditions, seedbed preparation, the use of nurse crops, renovation of depleted pastures, weed and pest control, and numerous other problems needed more adequate research. Before 1929, research on grassland farming was rather meager. Most agricultural experiment stations had devoted the major part of their work toward improving cultivated crops. The grasses and legumes were largely neglected, aside from a few of the more common hay crops.

When the first soil erosion experiment stations were established in 1929, they began devoting a major part of their research toward the use of grass and other sod crops in erosion control. Within a few years, this work began to direct attention to other grass and legume problems. As the grassland movement gained momentum, the State experiment stations carried on more and more research on the use and management of these soil-holding, soil-improving, and animal-producing crops. During the last 15 years, a great fund of scientific knowledge about grasses, hitherto unknown, has been developed. Today most grassland farmers can get much more accurate infor-

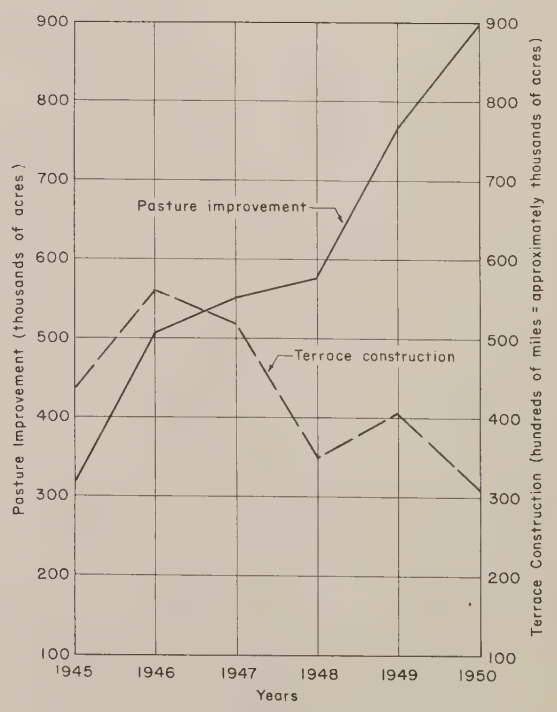
Soil conservation experiment stations have measured the effectiveness of different grasses for stabilizing water-disposal systems under varying conditions. Bermuda grass, as shown here, proved to be one of the best for areas where it is adapted.

mation about their various problems than they were ever able to get before.

The present-day grassland farmer knows that it pays to fertilize most pasture and hay crops. He knows, also, that it pays to fertilize and reseed old pastures where stands of grass are thin or where poor forage types of grass predominate. He mows weeds and clears brush from his pastures and meadows and often uses a chemical spray to control weeds in grass seed plots. He knows which grasses are best for his waterways and which will do best on his eroded or worn-out lands. Soil Conservation Service research has shown the resistance various grasses offer to water flowing along waterways in various parts of the country, and this aids greatly in making the right selection of grasses to stabilize these outlets for excess runoff. This knowledge and these services are helping greatly as guides to the advancing grass program. Besides, farmers have a variety of choices in selecting grasses and legumes that fit into their long-term crop rotations. But probably, above all, farmers are now able to get the right seed for the different kinds of land.

Grassland Boom Grows

An indication of how grasslands have become increasingly important in the soil conservation program during the last few years is given by a comparison of the amounts of terracing and pasture improvement work done by conservation farmers in five Southeastern States (see chart). Up until the last few years, terracing was generally the most widely used soil conservation practice among farmers of North Carolina, South Carolina, Georgia, Alabama, and Mississippi. Terracing is still important in this region but it is no longer the most widely used conservation practice: improved grasslands are now considered much more important by most farmers.



Comparison of terrace construction and pasture improvement work done each year by farmers cooperating with soil conservation districts in North Carolina, South Carolina, Georgia, Alabama, and Mississippi -- 1945 to 1950.

For example, in 1945 the acreage of pasture improved by reseeding, fertilizing, or other means was only about three-fourths as much as the acreage terraced by farmers cooperating with soil conservation districts in these states. In 1950, the acreage of pasture improvement was about three times as much as the acreage terraced.

Another indication of the growing interest in grass is the grassland contests that are springing up in various localities under such names as "Twelve Months Green," "Keep Tennessee Green," "Green Pastures," and "Grassland Farming." Many of the contests are on a county, state, or soil conservation district basis. One in New England is on a regional basis. Sometimes the prizes are only certificates of achievement. More often there are substantial cash prizes, put up by some commercial concern, civic club, or farmers' organization.

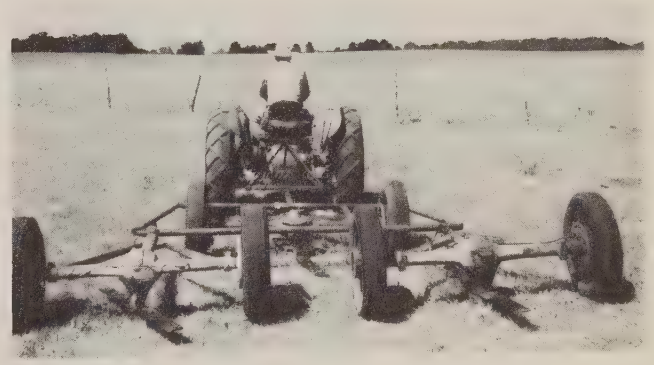
Grassland Farmers

Warren Brockway, a dairy farmer near Milo, Maine, has 112 acres of high-quality hay and pasture crops on his 250-acre farm. All the rest of the farm is in woods. He uses ladino clover, timothy, and bromegrass mainly for his hay and pasture. He produces all the roughage consumed by more than 50 milk cows and about 25 heifers and calves from 112 acres. He buys some grain for his cattle; he thinks that is better than raising the grain and having to buy hay. Besides, the cows produce more milk when they get green pasture most of the year and good hay or silage the rest of the time. Brockway is not the only dairy farmer who has found it profitable to put all his cultivated land to grass. This is becoming a common practice among dairy farmers of the Northeast, and some beef and sheep farmers in other sections are doing the same.

Conservation farmers apply fertilizer and lime to their grasslands, just as they do to cultivated crops.

F. O. Fields of Sumter County, Alabama, bought an eroded, run-down farm of 320 acres in 1936. In 1942 he became a cooperator with his soil conservation district, and soon became a grassland farmer. Today, his entire farm is in grass and woods. His only market products are grass and legume seed, beef, and timber. He estimates that his farm is producing twice as much and is worth more than five times as much as it was before he started his grassland program.

Alfred Austin of Benton County, Arkansas, is one of the pioneers in modern grassland farming. He stopped growing row crops 15 years ago. All his land is

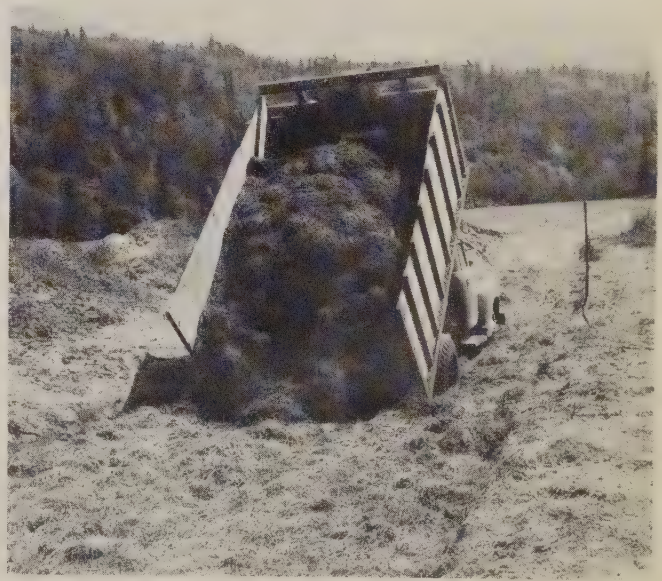


From scrap metal and the rear wheels of old automobiles this conservation farmer made a machine that will cut the weeds and sprouts in his pastures about three times as rapidly as will a standard mower. The rotary blades cut very little grass.

in grass or woods. He has a high-producing herd of dairy cattle and a flock of 100 Hampshire ewes. He has a year-round pasture program--a "twelve months green" program. Bermuda grass, lespedeza, Dallis grass, white clover, Sudan grass, Suiter's grass, ladino clover, and kudzu are his crops. He buys no grain for his sheep and very little for the milk cows.

There are thousands of other farmers across the country who have changed from row-crop farming to grass agriculture. Obviously, all farmers can't put their entire farms to grass or woods. Grain, oil crops, fibers, tobacco, vegetables, potatoes, and other crops are needed also. But, most grassland farmers are not putting all their land to grass. They are using grass and legumes as they should be used in a practical conservation-farming program. They plant their steep, highly erodible lands and other areas less suitable for cultivation to pasture or meadow. They grow sod crops in rotation with row crops to maintain good soil tilth and organic matter. They use

Grass and legumes grown in rotation with row crops improve soil tilth and fertility and increase the water-holding ability of the soil, especially when turned under as green manure as this Kansas farmer is doing.



Grass and legumes make excellent silage without any special treatment. This Washington farmer chops freshly cut grass with a portable silage cutter (left). The chopped grass is dumped in a trench silo (right).

Grass strips and waterways control erosion on this Illinois farm while producing a valuable hay crop.

cover crops in their clean-tilled fields when and where needed. They use strip cropping, grass waterways, and diversions where needed. And above all, they take care of their grasslands--they give them the same consideration that they give their cultivated fields.

A Permanent Agriculture for the Nation

It is not just the individual farmers who will profit from a grassland agriculture. The Nation has a vital stake in this matter. It means better conservation of our basic soil and water resources. It can provide one of the best means for adjusting agricultural production each year to the actual needs of the country, with eroding and deteriorating crop land being planted to sod crops when a heavy surplus of grain and fiber crops seem probable. The grassland, in some instances, can be safely plowed up when an emergency demands an increase in cultivated crops. In fact, grassland farming does not necessarily mean less corn, less cotton, less wheat, less potatoes, or less tobacco. The acreage of these crops is usually decreased to some extent on grassland farms; but the yields per acre usually go up within a few years so fast that the total production is increased. Furthermore, the amount of grain consumed by livestock is much less where plenty of good pasture and hay are available.

John Fleming of Hartington, Nebraska, recently summed up the average grassland farmer's experience this way: "As for crops? Well, even though we've seeded down quite a bit of former cropland in waterways, in odd areas, in the crop rotation, and on land not suited for cultivation, we still are raising more crops than before."

In the final analysis, grassland farming nearly always means a greater total production. In addition, the productivity of the land can be maintained almost indefinitely, and usually yields are increased. This is a natural way of farming, and a practical way of farming. It is conservation farming--the only kind of farming that can be done year after year without depleting the land. It is farming in accordance with nature's example--that is to say, nature employs grass and trees to keep the land perpetually productive. Grassland farming follows this example, with grass as the basis of stability and permanence.

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